The discursive politics of 'fracking': frames, storylines, and the anticipatory contestation of shale gas development in the United Kingdom

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1. Introduction

'Framing' and the associated notion of storylines are crucial concepts in the study of environmental politics and climate policy. The concept of framing has been employed recently to understand consumer behaviour (Wolske et al., 2018), contrasting understandings of controversial issues (Cairns and Stirling, 2014), and public support for policy options (Feldman and Hart, 2018). There is widespread acknowledgement that environmental policy problems and the objects and physical realities to which they relate are not accessed in some unmediated way by humans but are always encountered through interpretation and language (Hajer and Versteeg, 2005; Hilson, 2015; Schon and Rein, 1994). Environmental policy problems will often be interpreted and spoken about in a number of different ways, constraining and enabling thought and action in various directions (Hajer, 1995; Schon and Rein, 1994). Here, so the theory goes, the skilful use of language can bridge an old impasse by creating new ways of thinking and establishing the basis of consensus amongst actors with heterogeneous beliefs, interests and political identities (Benford and Snow, 2000; Hajer, 1995). In this context the way policy actors frame a controversial environmental issue emerges as a crucial topic of study that can reveal how the construction and communication of an environmental policy problem reflects certain interpretations, values and worldviews and not others, highlights and forecloses particular solutions, and succeeds or fails in building support around certain interpretations and attendant ways forward.

Drawn from 30 original interviews and a large-scale political document analysis (n=1,557), we conduct an analysis of the key frames and associated storylines operating in the national policy debate over shale development in the United Kingdom[1]. Shale gas is an unconventional hydrocarbon the exploitation of which usually requires the use of the controversial technique hydraulic fracturing. Hydraulic fracturing, the extraction of unconventional fossil fuels and the associated industrial infrastructures and processes are often colloquially referred to collectively as 'fracking', though we follow Evensen in using the term 'shale development' (Evensen, 2015). Shale development has been contentious more or less wherever conducted or proposed (Steger and Milicevic, 2014; Wood, 2012). Whilst recent UK governments have been strong proponents of shale development, progress towards the development of a domestic industry has been slow. There were signs this might be about to change in 2018 with the completion of the first horizontal wells in the UK and the resumption of hydraulic fracturing seven years after it was initially used in the UK by the company Cuadrilla. However, optimism has been somewhat tempered because Cuadrilla's operations have

[1] We refer here to the UK (Westminster) Government level of policy debate, rather than policy debate across the UK at various levels of governance (e.g. devolved parliaments).

consistently caused low-level seismicity, exceeding regulatory thresholds and raising questions about the viability of the endeavour within the UK's strict regulatory environment.

In this study, we explicitly ask: What are the key frames and associated storylines 'for' and 'against' shale gas in the UK political debate? How does frame use shift over our timeframe? Are there any distinctive features of the UK shale gas debate on the basis of our analysis? Lastly, what does the empirical phenomena of shale gas framing tell us back about theories of discourse and political communication? To answer these questions, the article proceeds as follows: The following section reviews the literature on 'framing fracking' in the UK, highlights some of the subtle differences in conceptual approach within this literature and sets out our particular integrative approach to the concepts of frames and storylines. Next, we introduce our mixed methods approach, detailing our interview sample, document analysis corpus, and approach to analysis. Section four answers our first research question by presenting the nine key frames that we identify in the UK policy debate over shale development, and highlighting a number of recurring storylines associated with each. In our discussion section, we answer our remaining research questions concerning the temporality of frame use, comparisons with other national case studies, and the implications of our study for political communication more broadly. Finally, our concluding remarks highlight some key findings and implications of the study and suggest avenues for further work.

In proceeding on this path, we hope to make two contributions. How contested sources of energy such as shale gas are perceived in frontier countries considering adoption is significant for national and international climate policies. The UK case is of particular interest at this juncture because, after early optimism in Poland dissipated (Nelsen, 2015), the UK is arguably at the forefront of shale development in Europe and is potentially a litmus test for its social legitimacy across the region. This is certainly the view taken by the UK government who recently coined the notion of a 'UK model' – "the world's most environmentally robust onshore shale gas sector" (BEIS, 2018a, no pagination). The UK model positions the UK as a pioneer, learning from mistakes in the US and demonstrating to other densely populated, environmentally conscious, and precaution minded European countries that shale resources can be exploited in socially and environmentally acceptable ways. As such, the unfolding discursive contest over shale development in the UK may have wider significance across Europe.

Furthermore, the UK shale gas debate has relevance in revealing how social and political actors *anticipate* the potential deployment of a contested innovation. What is partly so fascinating about the Westminster debate about shale gas is that hydraulic fracturing has not yet commenced in the UK in any meaningful way. The debate is largely pre-emptive and anticipatory, with frames and storylines operating and circulating in the absence of any UK-specific empirical evidence for and against shale development. Instead, predictions have to be based on extrapolating from other national contexts where shale development has been widely deployed – e.g. the US – in ways that appear easily undermined by opponents. Our study reveals the relative impotence of anticipatory discourse, the difficulty of achieving resonant frames and storylines about the prospective deployment of an innovation in such circumstances, and the way this leads to a relatively deadlocked debate.

2. Conceptual framework: An integrative approach to frames and storylines

The shale gas issue in the UK has received a great deal of attention from scholars (Evensen, 2018). Survey methods have been employed to measure levels of acceptance and knowledge, and the relationship between them and with other factors such as demographics, political affiliation and environmental values (Andersson-Hudson et al., 2016; Stedman et al., 2016; Whitmarsh et al., 2015). Participatory methods have also been employed to explore public perceptions of hydraulic fracturing (Partridge et al., 2018; Thomas et al., 2017; Williams et al., 2017), including by work published in *GEC* (Partridge et al., 2017). The regulatory (Hawkins, 2015; Stokes, 2016) and planning (Bradshaw and Waite, 2017; Rattle et al., 2018; Short and Szolucha, 2016; Szolucha, 2018) systems have also received attention, especially the scope for local communities to influence decisions through the latter (Beebeejaun, 2017; Cotton, 2017; Hilson, 2015). How the issue is represented through old and new media is another area of focus (Jaspal and Nerlich, 2014; Jaspal et al., 2014; Mazur, 2016).

Finally, like this study, the concept of frames has been popular with scholars attempting to characterise and understand the public debate over shale gas in the UK (Bomberg, 2015; Cotton et al., 2014; Nyberg et al., 2018a; Stephan, 2017). In its broadest sense, a frame refers to a way of mentally or discursively defining a topic. For Benford and Snow (Benford and Snow, 2000, p. 614), framing is about actively constructing meaning, denoting "an active, processual phenomenon implies agency and contention at the level of reality construction". Frames allow a social reality to be constructed or challenged; it is not merely language or words, but a reality for how actors and objects are made meaningful, and then naturalized (Nyberg et al., 2017). Furthermore, frames not only compete for public attention or 'consumption'; they also compete in what Nyberg et al. (Nyberg et al., 2018a, p. 3) term as 'framing contests' where "different social actors construct rival understandings of contested social phenomena and seek to mobilize support for their preferred 'frame' over rival 'counter-frames'". Many of the studies that attempt to connect 'frames' with shale gas are also at least partially influenced by Hajer's related notion of a storyline, with the relationship between these two concepts being interpreted in different ways.

As table 1 demonstrates, four pro-shale development frames, and three anti-shale development frames have been consistently identified in the UK. Frames concerning economic opportunity, energy security, reassurances over risk, and shale gas' role as a 'bridging' fuel have been employed by the UK pro-shale development coalition; whilst the anti-shale development coalition has used frames concerning threats to the local environment and public health, fossil fuel lock-in and bad governance.

[Insert table 1]

The present study contributes to and empirically extends on the insights in the above literature in three ways. First, the timeframes of the above UK studies are relatively short, miss out events in the last few years, and are in some cases periodic (Bomberg, 2015; Jaspal and Nerlich, 2014). By

contrast, our study focuses in a continuous fashion on the time period 2010-2018. This period encompasses the entirety of the period the above studies collectively cover (Aug 2010 – June 2016), and includes the subsequent period (July 2016 – November 2018) in which a number of key events have occurred.

Second, our document analysis corpus is unique and quite different to the focus of the studies above. The studies above overwhelmingly focus on news media coverage. Our study focuses specifically on the UK policy debate, and so provides evidence about the penetration and use of frames in capital 'p' political sites. This empirically novel focus allows us to track the use of frames and storylines in and through conventional political institutions and practices. These are obviously crucial sites for influencing both general UK policy on shale gas and the specific regulatory conditions within which a shale industry will have to operate. Whilst Nyberg et al. (Nyberg et al., 2018a, 2018b, 2017) focus on four select committee inquiries and reports, and so have a focus on the use of frames in and through similar institutions and practices, we draw data from original interviews and a more comprehensive corpus of political literature.

Third and finally, the studies above either apply a single method (Bomberg, 2015; Jaspal and Nerlich, 2014; Nyberg et al., 2018a) and/or have relatively small sample sizes (interviews – Cotton et al. n=21, Stephan n=9; document analysis – Bomberg n=103, Cotton et al. n=411, Jaspal and Nehlich n=341, Stephan n=282). As detailed below in the methods section, we were somewhat more rigorous, with 30 interviews and a systematic analysis of 1,557 political documents. As a result, the discursive features presented here have been identified across a longer timescale and within different sites and practices, and in some cases are we would argue more robustly and richly drawn.

A notable feature of the literature reviewed above is the various ways in which the concept of a 'frame' is used, and how it is related to the notion of a 'storyline'. This is not unique to work on shale development and has been identified in the use of the concept across the social sciences. For instance, Robert Entman has described framing as a 'fractured paradigm'(Entman, 1993). For Bomberg a storyline is an overarching narrative made up of a number of frames (Bomberg, 2015). Stephan on the other hand sees frames and storylines as effectively synonymous (Stephan, 2017). Quoting Jacob Torfing, Stephan considers storylines at their best to be a "short, condensed and often metaphorical expression" (Torfing 2011, p. 1884, quoted in Stephan 2017, p. 162), using the example 'keep on the lights'. Unlike the other authors discussed here, Hilson sticks diligently to the concept of 'frames' without introducing Hajer's storylines (Hilson, 2015). Here Hilson follows Entman closely in defining framing as essentially involving *selection* and *salience* (Entman, 1993). In other words, framing entails selecting some aspects of an issue and emphasising them "in such a way as to promote a particular problem definition, causal interpretation, moral evaluation, and/or treatment recommendation for the item described" (Entman, 1993, p. 52). This variability in approach raises a number of questions. Are storylines large phenomena like an overarching narrative, or short slogans? Are storylines and frames synonymous, and if not how are they related if at all? Is framing purely about selection and salience or can it involve other types of linguistic devices that achieve different sorts of effects?

We put forward an integrative approach in handling the relationship between these concepts. From Entman and Hilson we take the focus on what might be thought of as 'editorial' decisions over the aspect of an issue that is focused on, and the elements that are foregrounded and backgrounded.

Here a particular framing gives a distinct sense of the problem, what is at stake, and what kinds of solutions are required. For example, one of the frames we introduce below – the 'bad gas governance' frame – defines the shale development issue as a problem of democracy and governance; suggests that people's faith in local democracy is at stake; foregrounds issues around legitimacy, inclusion and trust; and suggests more participatory and decentralised decision-making as a solution. This is obviously very different from the 'risk' framing initially adopted by the UK government, which suggests a 'public knowledge deficit' problem, and public information provision as the solution (Williams et al., 2017). Of course, actors typically utilise a range of frames, even within a single statement, so no single frame monopolises the meaning of the issue.

However, the full range of the ways language is used in environmental policy disputes is not in our view fully captured in the above. Alongside broader questions of what is focused on, and what is emphasised, there is the more intricate use of linguistic devices to appeal to particular audiences, bolster the credibility or relevance of claims, and to generally create a particular impression along a normative direction. This is where, on our interpretation, Hajer's notion of a storyline comes in. To be clear, there is ambiguity in Hajer's explication of this concept, and it is perfectly legitimate to interpret a storyline as being an overarching narrative, as Bomberg does. However, Hajer also describes a storyline as being an "analytical term that unites several established concerns in research in the constructivist tradition", including metaphors, "analogies, historical references, clichés, appeals to collective fears or senses of guilt" (Hajer, 1995, p. 64). This is on our reading the clearest sense given as to what in particular the analyst is looking for when trying to identify storylines.

For example, one of the frames we will introduce below – the 'low impact development' frame - frames shale development as having only a small and temporary impact on the British countryside. The frame highlights the normal and temporary nature of the land-use impacts associated with shale development; and stresses that the UK industry will fit large numbers of lateral wells on relatively few wellpads, thus reducing the surface footprint of the industry. A key, recurring storyline within this frame is the analogy of Wytch Farm. Wytch Farm is a conventional oil-field in Dorset on the south coast of England where a form of well stimulation called water injection has been used. It also happens to be located within an Area of Outstanding Natural Beauty and near one the UK's most expensive postcodes. Shale development advocates suggest that locals tend to not be bothered by or even aware of the site. The storyline of Wytch Farm is used to bolster the credibility of the central claim of the low impact development frame – that shale development will not industrialise the British countryside. The storyline is used to create the impression that shale development could also discreetly fit into rural areas without spoiling their character, having a detrimental impact of house prices or even being noticed by many locals and visitors. The storyline also attempts to undermine anti-shale development actors' visions of industrialisation by pointing to a supposedly analogous real-world example of onshore hydrocarbon development that tells a very different story. As will be seen below, the anti-shale development coalition contests the relevance of the Wytch Farm analogy.

Therefore, for us, a frame sets the topic of conversation and highlights particular elements over others, whereas storylines – metaphors, analogies, distinctions, slogans, references, etc. - work more intricately within these boundaries in various ways to create a particular impression of shale development. Some will be concerned about the integration of two distinct concepts in this way, however we would argue that this approach can be justified on the grounds that the concepts share

both an epistemic culture and a commonality in the phenomenon to be explained. They are both constructivist concepts (certainly storylines, and the versions of framing that interest us here) interested in explaining how actors use language for particular purposes in discursive contests. They can, therefore, be productively co-operationalised to cover the coarse-grain level of selection and salience on the one hand, and the fine-grain level of intricate linguistic devices on the other.

Frames and storylines bring together and are the tools of discourse coalitions. For Hajer these coalitions are heterogeneous and united more by language than by interests or identity (Hajer, 1995). Discourse coalitions compete for discursive hegemony, and this attempt to secure support for their definition of reality is determined by the relative power or resonance of a coalition's storylines and frames (Hajer, 1995). For Hajer, discursive power is influenced by three factors: credibility, acceptability and trust (Hajer, 1995). In Bomberg's adapted version, credibility or plausibility is about how compelling the various kinds of claims (e.g. epistemic, moral, emotional) associated with a frame are, and can be increased by storylines that make reference to other cases. Acceptability or relevance becomes a matter of whether claims associated with a frame are applicable to the audience's experiences and everyday lives and can be improved by storylines that make connections with more familiar things[2]. Trustworthiness concerns the confidence that an audience has in the actors, institutions and practices associated with a particular frame (Bomberg, 2015).

Hajer is fundamentally interested in the creation of common understandings of environmental problems, around which discourse coalitions form and which may be institutionalised if they possess sufficient discursive power (Hajer, 1995). Hajer finds it remarkable that inter-discursive communication is possible. In other words, that diverse sets of actors each with their own mode of talking – for instance, physicists, ecologists, engineers, politicians, environmentalists, and so on - are seemingly able to understand one another when an environmental issue brings them together. Storylines play a key role in this improbable achievement, which Hajer terms 'the communicative miracle' (Hajer, 1995). Since complex environmental issues implicate a number of distinct discourses and are rarely understood in their entirety by any single actor, storylines enable discursive closure by allowing diverse sets of actors to come to a seemingly common understanding on the basis of shorthand and metaphor. Although Hajer does talk of common understanding, he is also clear that coalition members may have differing understandings of the meaning of the storylines that bind them (Hajer, 1995). Therefore, storylines create, if not necessarily mutual understanding, then the possibility of communication and agreement on the way forward amidst specialisation, fragmentation and difference.

3. Research design: Repeated interviews and political document analysis

[2] A classic example here is the industry storyline that suggests that chemical additives to hydraulic fracturing fluid are not a great concern because these same chemicals are found in cleaning products that most of us keep under our kitchen sink (of course the packaging of said cleaning products typically includes dire toxicity warning symbols and instructions to immediately seek medical assistance if ingested!).

A longitudinal and mixed methods approach was employed combining 30 elite semi-structured interviews with policy-aligned stakeholders and an analysis of a corpus of 1557 political documents. Details of the interviewees are summarised in table 2. An initial 11 interviews were conducted in late 2015 and early 2016 to help identify key issues and actors associated with the UK policy debate on shale development. This was then supplemented by a review of existing literature and news media to help identify a subsequent 19 interviewees conducted between July and November 2018. The document analysis ran parallel to this and some candidate interviewees emerged inductively from this analysis.

For the interviews, a selective sampling strategy was employed and ensured a good balance between categories of stakeholder and positions on the issue. An interview schedule was piloted and refined during the initial interviews. The majority of interviews were conducted face-to-face, with the remainder done by phone. With participant consent the interviews were audio recorded and then selectively transcribed. Interviewees have been anonymised and are referred to by a generic actor type.

[Insert table 2]

The construction of the document analysis corpus began with the identification of relevant types of political documents. The nine relevant document types that were identified are summarised in table 3. Relevant documents were identified from various Government and parliamentary webpages (see table 3) by using the keyword search terms 'hydraulic fracturing', 'fracking', 'shale gas', and 'unconventional gas', except where there was no search function or only a title search function (see table 3). A timeframe of 01/01/2010-30/06/2018 was selected. The start date was selected based on an analysis of the emergence of shale development as a political issue in the UK (triangulating between academic literature, the initial interviews, news coverage, and Hansard), whilst the end date was selected to coincide with the beginning of the document analysis so as to avoid a 'moving target'.

[Insert table 3]

Documents and interview transcripts were then stored in and analysed using Nvivo 12 software. Initial themes were developed through the initial interviews alongside a review of the academic literature. The initial themes aided the selective transcription of subsequent interviews, and the initial stages of the document analysis. Analysis therefore combined inductive and deductive analytic approaches in line with the approach of Stephan (Stephan, 2017), and in a way that can be described as 'retroductive' (Glynos and Howarth, 2007; see also Mason, 2002; Suddaby, 2006; Urquhart, 2013 for related approaches). That is, candidate insights emerged from both existing work and inductively through our analysis itself and were tested in a recursive to-and-fro. Candidate insights were tested on the basis of whether each proto-frame constituted a key frame on the basis of frequency of use, whether the particular way we divided and categorised our frames fit with the patterns of speech within our corpus, and whether collectively our frames gave good coverage of the common areas of debate in our corpus. Initial themes were concretised into frames on these bases and took on new shape through an iterative process of feeding insights from our analysis back into both the way that we operationalised our two key concepts, and the relationship between our frames and the content associated with each. Candidate frames that emerged from the existing literature were included if those existing findings were corroborated by our analysis, with other insights emerging inductively

through our analysis itself. In particular, insights about the contours of our frames, and boundaries between them tended to be inductive. For example, we deduced from existing work that economic and energy security benefits would likely be two key themes amongst pro-shale discourse and our analysis did indeed corroborate this. However, it also led us to categorise these two themes as a single frame on the basis that in our corpus they are so often invoked together and are connected by storylines like 'home-grown' energy.

The identification of storylines associated with frames was more inductive because these more intricate linguistic devices are located in the very specifics of the given texts being analysed. Having said that, because the authors have a large amount of experience studying the UK shale development case many of these commonly occurring metaphors, slogans and tropes were by definition unavoidably already highly familiar to us. The research team therefore approached analysis with intentional care to allow the analysis to speak for itself, rather than succumb to the temptation of allowing our prior research experience to 'fill in any gaps'. Storylines were identified on the basis of Hajer's instructions to look out for oft repeated figures of speech that become tropes and take on an almost ritual character (Hajer, 1995), for example describing shale gas as a bridge or pointing to Wytch Farm or Deepwater Horizon as an analogy.

4. Results: Unveiling nine contested political frames

Nine key political frames were identified, four of which are used by the pro-shale discourse coalition and five of which are associated with the anti-shale discourse coalition, which Hess (Hess, 2019) terms "counter-frames." The nine frames in aggregate, and their key storylines, are summarised in table 4.

[Insert table 4]

4.1 Pro-shale development frames

4.1.1 A bridge to a low carbon future

The lower carbon fuel frame concerns the relationship between the prospect of a UK shale gas industry and climate change. A key storyline here is a distinction between gas and other fossil fuels, especially coal. The frame sees gas as the 'cleanest fossil fuel' and so as having a longer-term role in the UK energy mix that is compatible with or even a positive step towards the UK's climate change commitments. Many proponents highlight the GHG emissions reductions that could be achieved by switching from coal to gas, often pointing to the case of the United States. As such, gas generally and shale gas specifically are described as 'clean', 'green' and 'lower carbon', and as a 'bridge' and a 'stepping stone' to a low carbon future.

> "It is coal that is the enemy of climate change and that is enemy No. 1. Gas is our ally in a green future" (Gregory Baker, Conservative, HoC, 26.01.15).

As well as making a distinction between coal and gas this frame tends to compare domestic shale gas favourably with alternative sources of gas in climate change terms. For instance, importing LNG when gas could extracted from beneath our feet is questioned on environmental grounds. These comparisons between shale gas and coal, and domestic shale gas and imported LNG are often supported by reference to a number of key technical reports, notably the Mackay and Stone report and the work of the Committee on Climate Change (Committee on Climate Change, 2016; Mackay and Stone, 2013).

> "Shale gas can create a bridge while we develop renewable energy, improve energy efficiency and build new nuclear generating capacity. Studies have shown that the carbon footprint of electricity from UK shale gas would be likely to be significantly less than unabated coal and also lower than imported Liquefied Natural Gas" (Amber Rudd, WMS, 16.09.15)

Another key storyline of this frame is the slogan 'the need for gas for years to come'. As such the debate becomes about not whether we use gas but where we get the gas we will use from. The timeframe here is occasionally fleshed out in relation to a number of 2 degree scenarios which often find significant levels of gas consumption in 2030, and a role, albeit a rapidly declining one, for gas well beyond that (DECC, 2012; McGlade et al., 2016; National Grid, 2017). The crucial point here is to emphasise that the timeframe exists to develop a domestic industry, exploit our shale resources and then transition away from gas whilst sticking within the constraints of carbon budgets.

> "Ultimately, this is not a debate about whether to use gas… This is a debate about where we get the gas we use from. Under the Department of Energy and Climate Change's central forecast scenario, we will be using broadly the same amount of gas in 2030 that we do today" (Dan Byles, Conservative, HoC, 18.07.13).

Crucial here too are associated judgements about the reliability and maturity of renewable sources of energy. This includes the view that renewable sources are not currently ready to be relied upon solely and that gas is needed as a transitional fuel whilst they are developed further. Furthermore, in the longer term the idea of gas as a baseload fuel counterbalancing intermittent renewables is regularly put forward.

4.1.2 American cowboys, learned societies and golden standards

The manageable risk frame concerns the risks to local environment and public health of hydraulic fracturing and of shale development more broadly. The frame seeks to reassure that these risks are low and that UK regulatory standards are sufficiently high to manage them. In fact, claims about regulatory standards often go well beyond mere sufficiency to 'gold standard' and 'world class', and the Government has recently put forward the idea of exporting a UK model – "the world's most environmentally robust onshore shale gas sector" (Greg Clarke, Conservative, WMS, 17.05.18).

> "Fracking is one industry that represents a huge opportunity for the UK, and our regulatory environment for it is the safest in the world" (Andrea Leadsom, Conservative, HoC, 16.11.18).

The starting point is often the United States in the period of dramatic production increases in the mid-2000s when regulatory standards are said to have been lax and 'isolated incidents' of environmental contamination are admitted to have occurred. The UK is often positioned as enjoying something like 'second mover advantage' as it is able to learn from and avoid the mistakes made in the US. Common storylines use the imagery of 'cowboys' and the 'wild west' to describe the situation as almost lawless and characterise it as foreign.

> "The great thing about the Committee's report… is that it indicates that the process is not, as in America, taking place in the wild west" (John Pugh, Lib Dem, HoC, 03.11.2011).

> "I also think one of the key issues in terms of evidence base that's used by the 'antis' is the experience of the industry in the early days in the US and Australia. And I think that was cowboy country… They were doing what they wanted… And even 25 years ago we wouldn't have been allowed to do it in a regulatory sense, so it never would have really applied" (Industry actor 5).

The point here is to draw a distinction between recent historical US standards and current UK standards and therefore invalidate the extrapolation of US health and environmental issues to the UK context.

Claims of low risk are backed up by reference to risk assessments from the Royal Society and the Royal Academy of Engineering and other notable bodies (Public Health England, 2014; The Royal Society & Royal Academy of Engineering, 2012). Furthermore, the expectation of high regulatory standards draws support from the track record of regulators in overseeing similar industrial activities, perhaps most notably the North Sea gas industry.

> "Reports by the Royal Society, the Royal Academy of Engineering and Public Health England have considered a wide range of evidence on hydraulic fracturing in a UK context, concluding that risks can be well managed if the industry follows best practice, enforced through regulation. We have one of the world's most developed oil and gas industries in the North Sea basin and some of the world's most experienced and highly regarded regulators. We have been successfully regulating the gas and oil industry in the UK for over 50 years. Our regulatory system is robust and we are proven world leaders in well regulated, safe and environmentally sound oil and gas developments" (Andrea Leadsom, Conservative, HoC, 30.06.2015).

This frame also often involves storylines that stress how old, familiar and established the process of hydraulic fracturing is globally, and how comparable it is from a regulatory and environmental risk perspective to more well-established conventional fossil fuel extraction in the UK.

> "It is far from being uncertain and risky. The first gas well was fracked on 17 March 1949. Since then 2 million wells have been fracked in the United States, and 200,000 in the last year, without anyone being poisoned from contaminated water, or any buildings or people suffering damage from minuscule seismic tremors" (Peter Lilley, Conservative, HoC, 18.07.2013).

> "Gas and oil produced from shale rock through hydraulic fracturing should be broadly similar to the existing gas and oil production in terms of the impacts on health, local amenity, traffic

movements and so on. The activities will be subject to the same robust safety and environmental regime, supplemented by new controls against the risk of earthquakes" (Michael Fallon, Conservative, HoC, 11.09.2013).

Those who use this frame often characterise objections to shale development on the grounds of risk to health and the local environment as being based on 'scare stories'. It also contains storylines that point to analogies where innovations and forms of development have been objected to on health grounds now widely regarded as being spurious, for instance MMR vaccines and mobile phone masts.

> "Look at the situation with phone masts. At one point if anybody wanted to put up a phone mast you would have protests… Fast forward however long people now know that that is not the case. MMR [is] another example…" (Industry actor 4).

4.1.3 Home-grown energy, energy independence and an industrial renaissance

The wealth and security frame concerns potential economic and energy security benefits that the development of a domestic shale industry may bring about. The frame includes both positive enthusiasm about the potential scale of the opportunity and warnings about the possible consequences if we fail to grasp it. Both the energy security and economic benefits are captured together in the notion of a 'home-grown' or 'indigenous' energy supply. These storylines communicate both that domestic supplies are inherently more secure than relying on the likes of Russia and Qatar (Norway is mentioned less frequently), and that domestic energy production is also taxed and creates jobs and supply chain multipliers in the UK. The potential financial benefits for local communities are also stressed and bolstered through the industry's benefits package and the shale wealth fund.

> "[S]hale gas has the potential to be a home-grown energy source which can lead to jobs and economic growth, contribute to our security of supply, and help us to achieve our climate change objectives" (Lord Henley, Conservative, HoL, 06.06.18).

> "We strongly believe that communities hosting shale gas developments should share in the financial returns they generate. The Government welcomes the shale gas companies' commitment to make set payments to these communities... In addition… the Shale Wealth Fund will provide additional resources to local communities" (Greg Clarke, WMS, 17.05.18).

Notions like an indigenous energy supply and anxieties over interdependence clearly resonate with broader dynamics currently playing out in UK politics.

> "If you accept that the referendum two years ago was about taking back control… Doesn't that also apply to our own energy needs? Should we not be taking control of our domestic gas supply, our domestic energy needs. We can do that. We have got enough… shale beneath our feet… [to] fuel our economy for the next 200 years" (Civil Society actor 2).

Several reports are regularly referred to in order to evidence claims of large economic benefits. These include those by the Institute of Directors and EY (EY, 2014; IoD, 2013). Connected here is a

sense of abundance created by a number of large resource estimates, most notably from the BGS (Andrews, 2013)[3].

> "All the indicators from the BGS are just completely stunning… You know, those estimates are enormous and that is a massive resource. I mean, there's a school of thought these days that there's more gas left than has come out of the North sea. So these are huge resources and huge reserves, potentially" (Expert actor 6).

Nervous and envious eyes are cast over to the United States which is said to have re-shored large numbers of jobs in energy intensive industries as a result of low energy prices largely thanks to the shale revolution there. Despite initial enthusiasm about the prospect of falling gas prices waning, the UK is said to have the opportunity to do something similar. There are also warnings that we will be at a competitive disadvantage against the US if we do not, encapsulated in the slogan 'getting left behind in the global race'.

> "We cannot afford to be left behind and ignore tumbling energy costs and rising competitiveness the other side of the Atlantic" (Lord Howell of Guildford, Conservative, HoL, 06.12.12).

Some point out that the most promising UK play happens to sit beneath some relatively economically peripheral regions where it can be difficult to create good jobs. The idea of an industrial renaissance in the North of England is floated and connected to the notion of the Northern Powerhouse. Failing that developing our shale resources is presented as a way to at least stem the tide of deindustrialisation in these regions.

> "What is more, it [shale gas] will create jobs in the areas of the country that need them most, and in the areas of our economy—manufacturing and related industries—where that is most important" (Peter Lilley, Conservative, HoC, 08.12.14).

> "Shale offers the hope of 70,000 new jobs, billions of pounds of investment in the regions, lower energy prices, keeping our energy-intensive industries alive and here, and providing energy security" (Lord Donoughue, Labour, HoL, 10.10.14).

> "Does my right hon. Friend agree that shale gas has the potential… to lead an industrial renaissance in this country…" (Andrew Selous, Conservative, HoC, 13.12.12).

These visions of re-industrialisation are often accompanied by a lament about the UK's lost industrial might and the sense, strengthened by the anti-shale development movement, that perhaps contemporary society is under-appreciative of fossil fuels, big engineering and heavy industry, and unwilling to tolerate their impacts.

> "There seems to be a move away from big engineering. You know big engineering, industry basically. Industry and industrial things have always fascinated me and I've always loved

[3] Much like the Mackay and Stone report, in relation to the lower carbon fuel frame and the Royal Society and Royal Academy of Engineering report in relation to the manageable risk frame, the prominence of these technical reports as reference point storylines attempting to enhance the credibility of the pro-shale coalition's frames chimes with Nyberg et al.'s argument that the pro-shale coalition's frames in particular have solidified over time through processes of certainty and quantification (Nyberg et al., 2018a).

them but they're big and ugly and dirty you know. They're manageable but on the face of it they're seen... we're moving to a service economy rather than a manufacturing economy essentially. And because of that we don't see the industry that we used to, so people have kind of 'off-shored' it in their minds to elsewhere" (Industry actor 5).

4.1.4 Normal nuisances and light footprints

The low impact development frame concerns the impact of shale development on the landscape and character of local places. This frame admits that there will be some local impacts, but that they will be temporary and the kind of nuisances produced by any form of construction project (e.g. traffic impacts). Here shale development is presented as being just like any other form of development.

> "We've always tried to approach this from an honest point of view. Yes this is going to cause traffic, yes this is going to cause noise in a very very similar way to other industrial activities and we will try and mitigate where we can… but ultimately there is a level of… disruption" (Industry actor 6).

As well as framing the (negative) impacts of shale development as entirely unremarkable the other purpose of this frame is to counter the idea that shale development will industrialise the countryside. As such, this frame envisages a UK shale gas industry that is more careful and targeted in developing pads and drilling wells as opposed to the sprawling trial-and-error approach said to have characterised the US experience. Furthermore, the industry envisaged is one that fits as many wells as possible on as few pads as possible therefore reducing the surface footprint of the industry in a UK context characterised by high population density and strong local opposition.

> "[T]he UK shale gas industry will be different from the US—greater population density and stricter environmental legislation in Europe will give a greater incentive to drill fewer, better wells that take advantage of multiwell pad technology and horizontal drilling to minimise the impact on the landscape" (HoC ECCC, 2011, p. 49).

The vision of a UK industry put forward is in stark contrast to the profound impact on the landscape depicted in a number of infamous aerial photographs of supposed US shale plays (the relevance of at least some of these images is disputed by the pro-shale coalition, who argue they depict conventional gas fields without the use of horizontal drilling). Instead of the pock-marked landscape of Wyoming the industry body has produced its own visualisation of what this 'light footprint' UK industry might look like (UKOOG, n.d.); and this is reinforced in the Institute of Directors report which, in its high-end scenario, envisages 40 lateral wells per well pad (IoD, 2013). As already seen, a popular, apparently more analogous reference point is the conventional onshore oil field at Wytch Farm, Dorset, which is used as an example of how this type of development can quite happily coexist with protected landscapes with minimum disruption. The fact that conventional gas fields have existed in parts of North Yorkshire and the East Midland for decades without anybody taking much notice is used to make a similar point. These storylines work to normalise the idea of onshore oil and gas development in the UK, where the offshore industry has dominated.

> "I mean interestingly in North Yorkshire, when it went to planning committee and people came to some of the community events and North Yorkshire country council's planning department had these big schematics up with aerial photographs and plans. And so 'what's

that?' I said well that's KM8, that's where they're proposing to do the hydraulic fracturing. 'But what's that one?', well that's KM1, that's KM2, that's KM5, that's KM6, over there's KM11. 'So what are they?' Well they're conventional gas wells, they've been here for 25 years and it's never caused you a jot of concern" (Regulator 1).

4.2 Anti-shale development frames

4.2.1 Dark satanic drills in a green and pleasant land

The industrialise the countryside frame concerns the impact of shale development on the landscape and character of local places. The impact of shale development on rural landscapes and communities is said to amount to the 'industrialisation of the countryside' and is expressed in both quantitative – numbers of truck movements and wells – and qualitative – the sense that the character of rural places will be altered – terms. In the latter case, the language is often highly emotive. The countryside is a 'quiet', 'tranquil', 'picturesque', 'peaceful' and 'beautiful' 'green and pleasant land'. Shale development on the other hand is 'heavy', 'intensive' industry and a 'rash' that represents an 'intrusion', 'imposition' and 'invasion' that will 'ravage', 'wreck', 'blight', 'pockmark', 'desecrate', 'disturb' and 'despoil' the countryside. The material stuff of the industry is described as not belonging or fitting in the countryside both literally (large HGVs on narrow country lanes) and more symbolically.

> "If this application is approved, a 60 metre-high drill rig will go on the brow of that hill for months to enable the initial drilling. Even when that drilling rig is removed - I accept that it will not be there for the entire time - the planning application confirms that up to 17 different bulky and highly visible items would remain there for up to five years… This is not a minor incursion into a landscape with similar features. It is the wholesale industrialisation of the Derbyshire countryside" (Lee Rowley, Conservative, HoC 22.11.17).

This frame includes a storyline that draws a distinction between unconventional and conventional development with the former being the more intensive operation due to higher depletion rates and so the need to continuously drill more wells (described by one industry interviewee as like being on a 'treadmill'), and higher levels of liquid waste and so the need for more truck movements.

> "First of all… unlike conventional oil and gas there is quite a dramatic falling off of production. So production tends to peak often at about 18 months. So then you have to go out and drill another well which is sort of ok in the States because you know on their vast prairies they just keep on drilling and keep on moving onto other wells. But you know that's more difficult to do in the UK" (Policy–maker/Representative 4).

The impact on the social fabric of local communities is raised by reference to the 'boomtown' phenomenon in the US experience, whilst the pro-shale development coalition's Wytch Farm storyline is dismissed as an analogy with the US images and experience being viewed as analogous.

> "It is not a question of a well pad being drilled and then the equivalent of "nodding donkeys", such as we have at Wytch Farm, nodding away quietly in the countryside. The

process of trucks, wastewater and re-fracking would have to be repeated every few years on that well pad in order to keep it going" (Alan Whitehead, Labour, HoC, 30.06.2015).

4.2.2 Fast-track fracking and fractured democracy

The bad gas governance frame concerns fairness of decision-making over shale development and the trustworthiness of institutions. The story here is one of unpopular development being forced on communities against their will by a government who are removing opportunities for community participation in decision-making, unresponsive to public views and concerns, too close to the industry, and insufficiently transparent. This frame also highlights the general public's deep ambivalence over shale development, most often by reference to the Government's own tracker survey (BEIS, 2018b).

With regards to local community input to decision-making, local communities are often described as being 'by-passed', and local decisions as being 'overridden'. A number of changes to the law and reforms to planning are seen as removing hurdles to development at the expense of the ability for local communities to influence decisions. Many of these changes were overwhelmingly objected to during public consultation but were nonetheless pursued. A key example here is the currently proposed reforms to the planning system that would see shale development production proposals determined under the nationally significant infrastructure projects regime and see non-fracking exploratory development treated as permitted development. Other examples include changes to trespass laws in the Infrastructure Act and granting the SoS for Housing, Communities and Local Government the power to call in planning applications and recover appeals.

> "A fourth thing is that it's a total violation of local democracy. You know, Lancashire County Council voted against fracking, communities have generally been hugely opposed to fracking in their area and its councils who understand best what the effects are going to be in their area. And they've been completely overruled by central government" (Environmental NGO actor 3).

These reforms are seen as an attempt to 'fast-track' fracking and Government shale policy is regularly described as 'rushed'. Not only does this speeding-up and streamlining have consequences for local community input, but it is also seen as careless.

> "The Government, however, have resembled a runaway train on the issue, with their latter-day "dash for gas". Their cavalier attitude to public concern about safety is feeding into a widely held view that they are pursing this process with scant regard for public safety" (Ian Lucas, Labour, HoC, 08.12.14).

The behaviour and trustworthiness of the Government is also regularly raised. Sitting on and redacting reports and watering down opposition amendments during the passing of the Infrastructure Act are two particularly oft-cited examples in our corpus.

> "The "Shale Gas: Rural Economy Impacts" report from the Department for Environment, Food and Rural Affairs… had 63 redactions within 13 pages, including of a whole section on the impact on house prices... [this] leads many members of the public to feel that they are

being deceived, patronised or treated with contempt" (Kevin Hollinrake, Conservative, HoC, 30.06.15).

4.2.3 Fugitive emissions, non-transitions and unburnable fuel

The dirty fossil fuel frame concerns the relationship between a prospective UK shale gas industry and climate change. It contests the lower carbon fuel frame's depiction of gas as a 'clean' bridging fuel, instead using 'dirty' backwards step storyline.

First, a distinction is drawn between conventional and unconventional oil and gas development with the latter said to potentially have much higher levels of fugitive emissions which are routinely underestimated and undetected.

> "I've been quite strongly convinced by a) the literature around methane emissions, fugitive methane emissions in particular, which suggests that the claims that shale gas is a clean fossil fuel have been again quite significantly exaggerated" (Expert actor 7).

Second, the reconcilability of a shale industry with UK carbon budgets is questioned. Shale gas is not seen as a bridge here but a diversion or distraction that 'locks' us into a fossil fuel energy system. Concerns are expressed about the 'crowding-out' of investment in renewables, the emergence of an industry coming too late to substitute for coal, and the impact of displaced fuel in the absence of strong global climate change polices.

> "The real reason to ban fracking is that it locks us into an energy infrastructure that is based on fossil fuels long after our country needs to have moved to clean energy. So today I am announcing that a future Labour government will ban fracking" (Barry Gardner 2016, quoted in HoC Library, 2017: 27).

Third, those who adopt this frame point out that globally a large proportion of already proven fossil fuel reserves cannot be burned if we are to mitigate the worst effects of climate change, often using the slogan 'keep it in the ground'. This storyline presents opening up new resources as extremely irresponsible and entirely wrongheaded.

> "We know that we do not need new fossil fuels; far from it, because in order to avoid a rise of more than 2° C from climate change, only one fifth of existing global fossil fuel reserves, not including UK shale gas, can be burned… Mark Carney, the Governor of the Bank of England, recently told a World Bank seminar that the "vast majority" of fossil fuel reserves should be considered "unburnable"" (Joan Walley, Labour, HoC, 08.12.14).

Finally, greater investment in renewables and energy efficiency is presented as a preferable alternative strategy that would create economic and energy security benefits.

> "Energy efficiency and renewables are already delivering jobs. They are very good at supplying employment and will do much more for energy security, lower bills and reduced emissions than an unacceptably risky shale gas industry can ever do" (Baroness Jones of Moulsecoomb, Green, HoL, 10.11.14).

4.2.4 Elusive threats and inadequate regulation

The elusive threats frame concerns risks from hydraulic fracturing to public health and the local environment. It claims that hydraulic fracturing creates unacceptable risks that will inevitably elude attempts to manage them, and expresses concerns about the adequacy of regulation and the capacity of regulators.

Water contamination and seismicity are seen as the key risks and they are presented as being uncertain, a matter of expert disagreement, beyond our control and insidious. Bans on fracking in other jurisdictions are used to support the frame's credibility. The frame also includes a storyline that plays up the novelty of the process, drawing a distinction between high-volume hydraulic fracturing on the one hand and older forms of well stimulation and conventional oil and gas development more broadly on the other. This storyline challenges the relevance of regulator claims about their track record overseeing the offshore conventional industry. Accidents and surprises are presented as inevitable backed up by a storylines that reference disasters in the oil and gas industry and beyond.

> "And then of course there's all the environmental side of things which is again at best sort of uncertain. I think I would characterise that water contamination is possible, because, you know… no one can guarantee any well is 100% secure... And I mean we've seen Piper Alpha, you know, the [Deepwater] Horizon disaster, [Exxon] Valdez - things go wrong" (Policy-maker/Representative 4).

Regulations are said to be inadequate to protect the public and environment, and as having been watered down to facilitate the industry. There is a particular focus on what is perceived to be a reliance on self-regulation in the system and government rhetoric on gold standards is contrasted to the Conservative party's natural deregulatory agenda. Finally, there are severe doubts about regulatory capacity in the context of budget cuts. In challenging the Government's gold standards storyline this frame attempts to legitimise the US experience as an analogy and counter a number of risk assessments whose low risk findings are contingent on good regulation.

> "There's clearly a lot of operational risk that may or may not be well managed. When I have watched the way the Government has both underfunded and institutionally constrained the Environment Agency's independence I'm more than a bit sceptical about the toughness of the regulatory regime to manage those" (Environmental NGO actor 1).

4.2.5 The revolution will not be reprised

The no repeat revolution frame concerns the prospects for the development of an industry in the UK. It is not necessarily anti-shale development, but sceptical about a repeat of the US shale revolution for a number of reasons. The degree of scepticism ranges from the view that differences between the US and UK will prevent a reduction in gas prices in the UK, to the view that these barriers are sufficient to prevent the emergence of an industry of any scale at all. The frame questions how analogous the US case is to the UK, and therefore expectations of benefits based on that case. The key differences mentioned here are population density, geology, mineral rights ownership, regulation, production costs, access to capital, lack of a service industry, integrated European gas market, strong NGOs and so on. With regards to population density, a key storyline

distinguishes the ‘wide open prairies’ of North America and the ‘crowded’ UK, with the latter often presented as inherently unsuitable for this industry.

> “The United States had certain characteristics that were favourable to a shale technology revolution, and at the end when I stopped thinking about this I'd come up with I think 17 characteristics ranging from sub-soil property rights, dynamic competitive service industry, access to capital, etc. etc. etc. And when you started to look at other parts of the world and say 'well how many of these characteristics are present in other parts of the world?' and the answer was 'no, not gonna happen'” (Think-tank actor 2).

> “Drilling hundreds of wells may work on the wide open prairies, but will that be the case in our national parks or outside Blackpool?” (Lord Truscott, Non-affiliated, HoL, 25.05.16).

5. Discussion - Temporality, cross-country comparisons, and impotence in anticipatory political communication

The findings presented above identify nine key frames and their associated storylines that are commonly utilised in the UK shale development policy debate. Of the frames identified, six are in a contest with a corresponding counter frame. These pairs of pro- and anti-coalition frames concern the issues of climate change (lower carbon fuel and dirty fossil fuel), risk (manageable risk and elusive threats) and land use impact (low impact development and industrialise the countryside). The remaining three frames on our analysis do not have a fully developed or aligned counter frame (wealth and security, bad gas governance, no repeat revolution). This is not to say that there is no discourse in our corpus concerning exaggerated economic and security benefits, good governance, and the excellent prospects for shale gas in the UK. Rather, in our corpus, this discourse is not widely recurring enough to form a key frame. Furthermore, there was a fair amount of discourse concerning the US shale revolution, and how shale gas could also be a game-changer in the UK too, but this almost always featured as a storyline within the wealth and security frame rather than a key frame in its own right.

These findings extend existing empirical understanding by identifying the levels of use of these discursive features in and through the institutions and practices of the Westminster policy debate covered by our rich corpus, and by charting their uses over longer timescales than previous work. Furthermore, whilst at least aspects of the frames presented above have been covered by previous work, we would argue that the no repeat revolution frame is fairly novel; and that the degree of prominence of the framing contest over land-use impacts and industrialisation differs from previous studies, which tend to treat these issues as part of a broader frame on ‘environmental degradation’.

We now pick out three themes worthy of further consideration in response to our remaining research questions. They are the use of frames over time, comparisons with other national case studies, and the resonance of frames and discursive dynamics.

5.1 Frequency and temporality of frame use

As table 5 demonstrates, pro-shale development frames were more commonly used within our sample; however, anti- frames were still widely used. The dominant pro frame is clearly the 'wealth and security' frame, followed by the 'manageable risk' frame; whereas use of the anti frames is more evenly distributed. The extent of the use of anti-shale frames in the sites and practices of the UK policy debate is a notable finding. This likely reflects the fact that whilst most of the UK Governments within our timeframe have supported shale development, party political opposition has increased during this period[4].

[Insert table 5]

Figures 1 and 2 demonstrate the use of pro and anti frames over time in our corpus, whilst figure 3 demonstrates aggregate pro and anti frame use. Indeed, these figures show that a collection of 9 positive *and negative* frames were there from the start, within the first year, implying that rather than a few frames starting the debate before a number of counter-frames emerged in response, a multiplicity of frames were invoked simultaneously from the start.

Frame use starts to pick up in Q2 of 2011 generally increasing to a crescendo between Q4 2014 and Q1 2015 after which use generally drops back to lower levels. There are no clear shifts in pro- frame use. The wealth and security frame is nearly always the most used frame, generally followed by the manageable risks frame, the lower carbon fuel frame and low impact development frame in that order. The story on the anti-shale development side is less clear; however, a marked increase in the bad gas governance frame does occur. The frame is barely used until Q1 2013 after which it becomes more prominent and is the dominant anti frame between Q4 2014 and Q3 2015.

A final point to make is that peaks and troughs in frame use seem to mirror each other. This strongly suggests that the use of frames is not straightforwardly related to events in the broader debate but to the vicissitudes of parliamentary business. For example, the period of high frame use between Q4 2014-Q2 2015 is explained by the passing of the Infrastructure Act. To be clear, the passing of the Infrastructure Act is clearly, on our analysis, a key event. However, the high level of frame use at this time is a result of parliament doing its job, rather than a response to some external event such as the Balcombe protests. The mirroring between aggregate pro and anti frame use may also reflect the adversarial nature of parliamentary debate in the UK - for instance, the use of a positive frame in a debate provoking an intervention that employs a negative frame.

[4] The Labour party initially took a cautious view on the need for strong regulation, but adopted an explicitly anti-shale development position under the leadership of Jeremy Corbyn. The Liberal Democrats, initially part of a coalition Government that supported shale development, came out against it once out of office. The SNP became a much larger force in UK (Westminster) politics after the 2015 general election and have also moved from a cautious approach to favouring a ban. Of course, within parties, backbench MPs and members of the House of Lords have sometimes taken a different view to party policy. For instance, recently a number of Conservative MPs have become increasingly sceptical about imposing shale development on unwilling local communities, therefore using the bad gas governance frame about their own Government.

Although not the focus here, there is also evidence of shifts in coalition membership, and which actors and institutions are employing particular frames over time. Some institutions or groups, such as the Green Party (staunchly pushing anti-frames) and Conservative party Government members (pro-frames) are consistent, whereas others go through shifts in frame use and coalition membership perhaps in some cases suggesting a malleable and strategic approach to frame adoption. As already mentioned, the Liberal Democrats, Labour, and the SNP all shift toward stronger anti-shale positions during our timeframe.

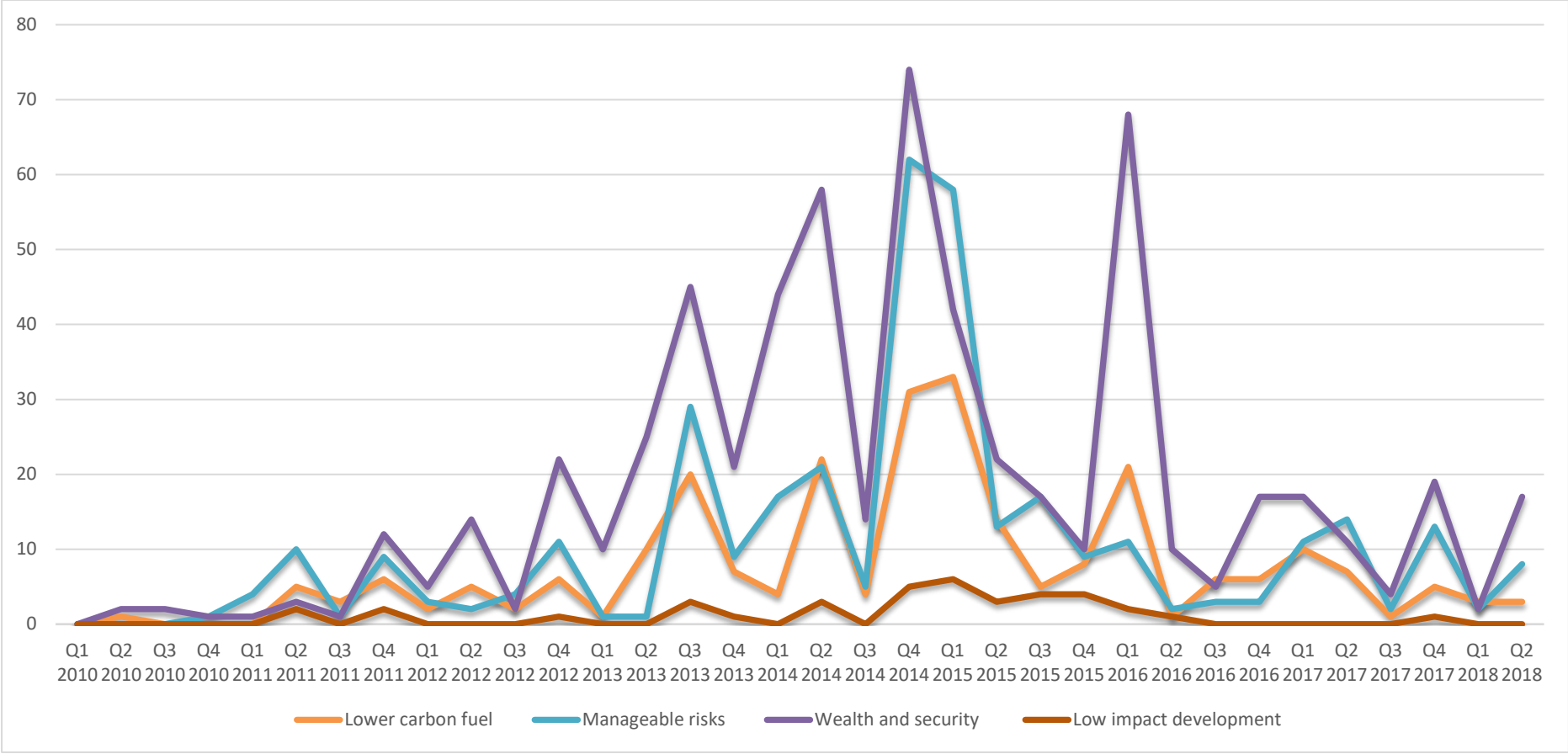

Figure 1: Use of pro-shale development frames over time by quarter, 2010-2018 [colour]

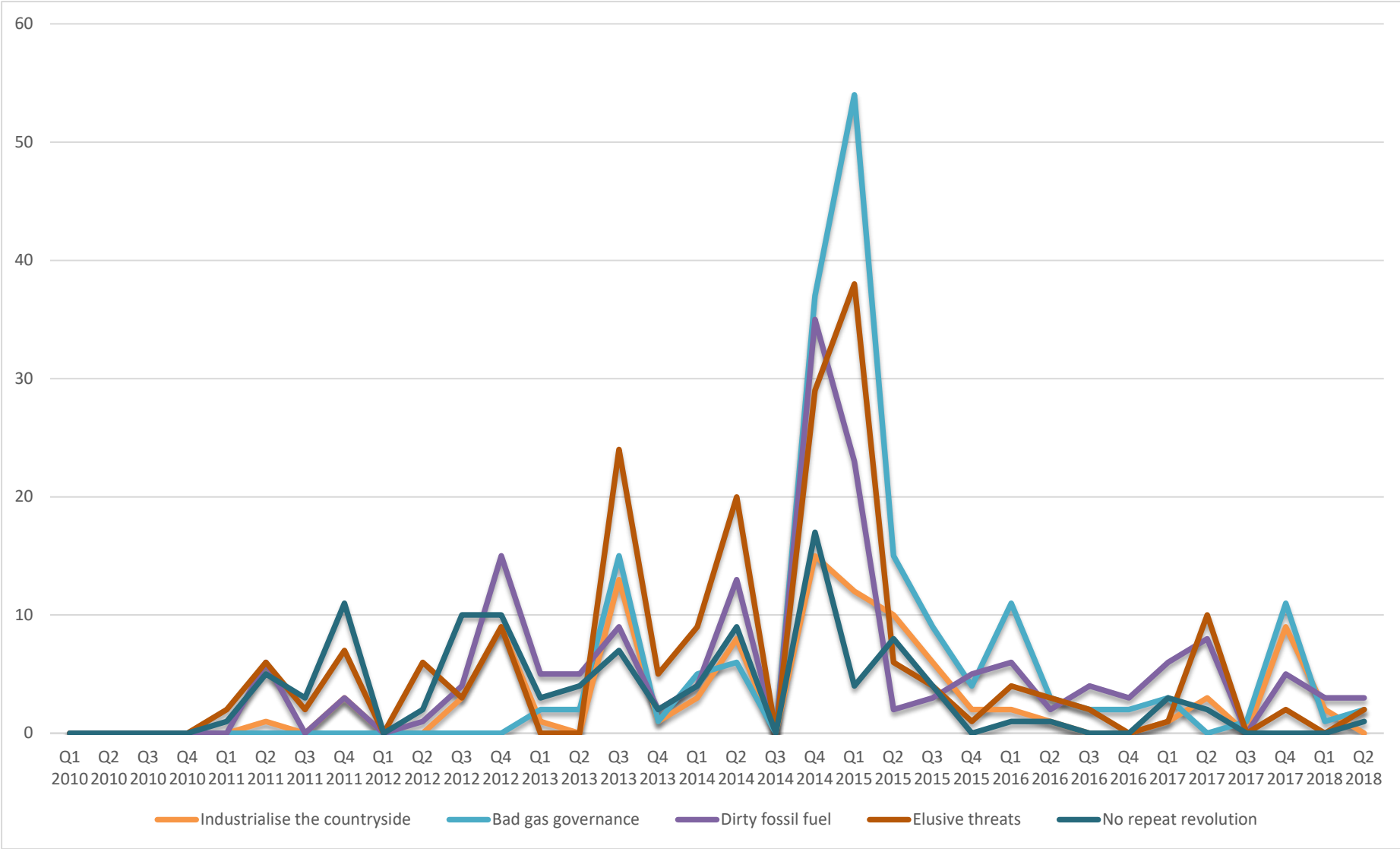

Figure 2: Use of anti-shale development frames over time by quarter, 2010-2018 [colour]

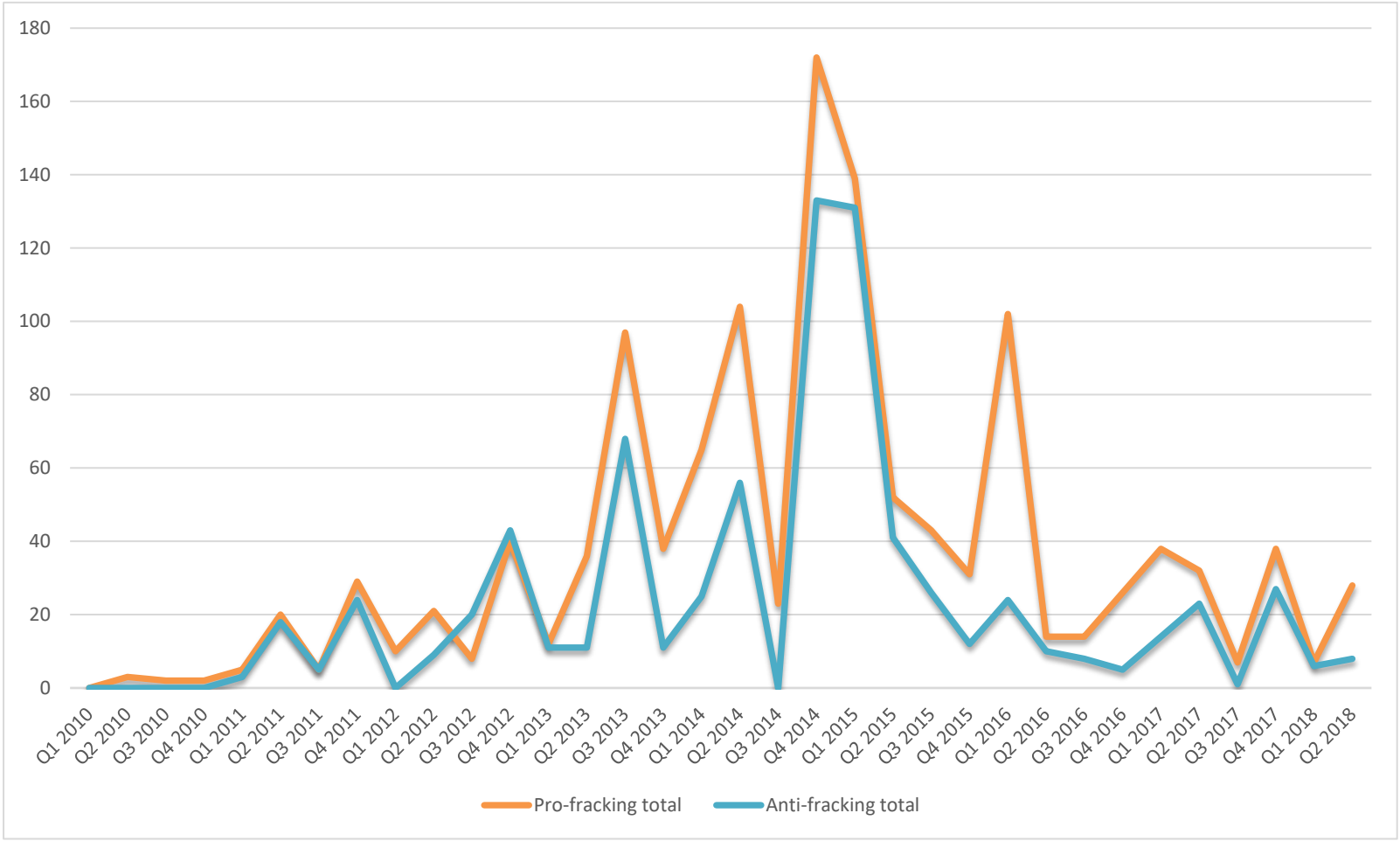

Figure 3: Aggregate use of pro- and anti-shale development frames over time by quarter, 2010-2018 [colour]

5.2 Universality and specificity of frames

Our second discussion theme concerns similarities and differences between the UK case and studies on the framing of shale development in other national contexts. The prominence of some frames seems particular to the UK and certain storylines are inherently local and context dependent; but others are more global, linking local or specific contexts to globally recognized discursive features revolving around employment, security, or the environment (Nyberg et al., 2018b).

The literature suggests a good deal of commonality in the way fracking is framed across Europe, South America, and in the US. It is clear that frames similar to our 'wealth and security' and 'lower carbon fuel' frames are dominant features of pro-shale development discourse across Europe and the US (Bomberg, 2017; Goldthau and Sovacool, 2016; Metze, 2017), albeit the latter is less prominent in the US (Bomberg, 2017). Interestingly, in Argentina, pro shale gas frames tend to emphasize 'attracting high economic investment' and creating an 'enabling business environment' (Chávez-Rodríguez et al., 2017), or bolstering 'trade' and regional 'exports' of natural gas (Mares, 2013), but not climate change or carbon. With regards to energy security, it is surprising how widely recurring the storyline concerning the threat of Russia is, including in countries not currently reliant on Russian gas imports. The 'risk reassurance' frame also seems be a relatively common feature in Europe (Bomberg, 2017), with the same storyline stressing superior environmental regulation to the US found in the Netherlands (Metze, 2017).

However, notable differences also exist. In contrast to the pride in high regulatory standards that is so central to our 'manageable risk' frame, Bomberg finds that the pro US coalition uses a frame that instead focuses on American technological excellence and warns against excessive and unnecessary regulation as a threat to economic growth (Bomberg, 2017). Our key, separate 'low impact development' frame appears to point towards a distinctive feature of the UK debate. This is likely explained by the presence of a particularly strong 'industrialise the countryside' frame in the UK which it attempts to counter; and the relative prominence of this framing contest over land use impacts on the countryside is in turn likely explained by a number of geographical and cultural factors at play in the UK, including population density and the role of the countryside in particular notions of Britishness.

There are also similarities and differences in the use of anti-shale gas frames across national case studies. Frames about local environmental risk and contamination dominate anti-fracking discourse across Europe, Argentina and the US (Bomberg, 2017; Goldthau and Sovacool, 2016; Mares, 2013; Metze, 2017), although the strong focus on regulatory competence and capacity we find in the UK is seemingly - on the basis of this literature - not repeated elsewhere[5]. This may be a result of the UK government's strong focus on regulatory excellence in the 'manageable risk' frame, which pushes the debate about risk towards a debate about regulatory adequacy and competence in practice. In Argentina, environmental frames seem more grounded in concerns over water rather than air pollution or climate. Mares (2003) cautions over 'environmental risks' such as water contamination and Chavez-Rodríguez et al. (2017) mention the importance of avoiding 'hydrological stress.' However, in distinction to the UK, Argentinian frames focus more on trade-offs with irrigation and

[5] Anecdotally, however, there are signs of a recent increased focus on a lack of regulatory competence amongst anti-shale development actors in the US.

agriculture (Rosa and D'Odorico, 2019). Argentinian frames are also much more concerned about 'political risk' and economic 'turbulence', given the country has a less certain political and regulatory environment than other shale gas regimes such as those in Europe (Waterworth and Bradshaw, 2018).

The 'dirty fossil fuel' frame is also used across Europe and the US (Bomberg, 2017; Metze, 2017), though seems less prominent in Eastern Europe and the US (Bomberg, 2017; Goldthau and Sovacool, 2016). The universality of the bad gas governance frame is unclear. Steger and Milicevic suggest it is a feature of global anti-fracking discourse (Steger and Milicevic, 2014), Bomberg locates it in Europe generally whilst it takes a different form in the US (Bomberg, 2017), Goldthau and Sovacool associate it particularly with Bulgaria (Goldthau and Sovacool, 2016), whereas Metze doesn't locate it in the Dutch case (Metze, 2017). As already touched upon, the prominence of the 'industrialise the countryside' frame and the framing contest over impacts on the landscape seem more prominent in the UK than elsewhere on our analysis. Finally, by definition, the 'no repeat revolution' frame would not be used in the US, and studies in Europe tend not to emphasize this type of discourse as a key frame, although one of its key storylines that stresses the difficulties for shale development posed by higher population densities than the US is found in the Dutch case (Metze, 2017)[6].

5.3 Frame resonance, impotent storylines, and strategic inconsistency

Our final discussion theme relates to frame resonance (or lack thereof) and discursive dynamics; and provides an answer to our final research question relating our empirical case back to our conceptual interest in frames, storylines and political communication more broadly.

As already discussed frame resonance is a subjective notion related to credibility, relevance and trustworthiness. Bomberg (2015) argues that the pro-fracking coalition's frames are in some ways quite strong but lack resonance because associated actors and practices are not widely seen as trustworthy. Although not dominant, Bomberg (2015) argues that the anti-fracking coalition's threat storyline is stronger, largely because of the relevance and trustworthiness of 'accidental activist' messengers, and the increased prominence of the bad governance frame which is proving more difficult to counter than the epistemic claims associated with the risk and lock-in frames. We would add that this is partly because the 'bad gas governance' frame is unique in that it is largely about behaviours and reforms that have occurred, rather than predictions and scenarios concerning the future which are relatively easily dismissed by, quite legitimately, questioning key assumptions and extrapolation from other national contexts.

[6] The focus on differences in population density between Western Europe and the US requires further comment. We have found this idea raised as both a constraint that will force shale development to be more targeted and concentrated (as a part of the low impact development frame) and as a factor meaning that a repeat of the US shale revolution won't be possible (as a part of the no repeat revolution frame). The way the US figures in UK discourse here tends to be rather undifferentiated. There is little recognition that different US shale play regions have, for example, vastly different population densities (as well as differing regulatory approaches), or indeed that in some relatively sparsely populated locations the sheer number of wells means that large numbers of people are affected (Czolowski et al., 2016).

Bomberg's analysis of the resonance of frames is largely interpretative, with support from survey research. We have not set out to analyse frame resonance here, though we will do in subsequent research where we will attempt to analyse the resonance of these frames in a more robust fashion using survey methods. What can be said for now regarding resonance though is that our case highlights the crucial importance of particular sorts of storylines – analogies and distinctions - in attempting to boost and undermine the credibility of frames. Supermarkets, mobile phone masts, Wytch Farm, the wide open spaces of Wyoming, the North Sea industry, plain cigarette packaging, MMR vaccines, the regulation of the banking sector, Deepwater Horizon, and so on, are all presented as either analogous to, or distinguished from a prospective shale gas industry by the competing sides. For instance, the manageable risk frame points to the track record of the regulators in the North Sea and makes a distinction between US and UK regulatory standards, whereas the elusive threats frame makes a distinction between conventional and unconventional operations and points to accidents like Deepwater Horizon and regulatory failures in other domains.

However, our study also demonstrates that these storyline linguistic tools seem insufficient to break the deadlock and achieve discursive dominance. Each coalition has their own set of analogies and distinctions (often disagreeing over whether a reference point is analogous) and each set appears strong enough for each coalition to defend the credibility of their frame, but too weak to dominate and define the reality of shale development. This is compounded by the fact that the UK shale industry remains a future possibility rather than a present reality. As such, attempts to understand how the development of an industry might play out must rely on extrapolating from historical cases of other types of development or cases of shale development in other geographical contexts. Referring to other cases is therefore a key means through which to improve the credibility of frames, though the repertoire of cases seemingly provides sufficient ammunition to both sides of the debate to undermine the credibility of the other side's frames.

This existence of sufficient discursive ammunition and its role in fuelling the framing contest parallel Daniel Sarewitz's notion of an 'excess of objectivity' (Sarewitz, 2004, 2000). Rather than the scientific facts that Sarewitz has in mind, here we see an excess of contradictory resources used to build credibility in modes of reasoning based on storytelling (e.g. for every storyline with moral related to the governance of risk like MMR, there's a corresponding storyline like asbestos or thalidomide). The stage of development in the UK, alongside the multiply suggestive repertoire of cases and the skilful use of these particular kinds of storylines by both coalitions, therefore, offer a possible explanation for the inability of either side to establish discursive dominance in the debate so far. In short, we find evidence of the impotence of frames and storylines in anticipatory political debate over a yet-to-be-deployed innovation.

Finally, our analysis makes clear that discourse coalitions seem to prize polyvalence over consistency in their framing strategies. This is particularly evident in the way that the pro-shale development coalition frame various aspects of the shale development in seemingly contradictory ways. For instance, shale development is simultaneously framed as an exciting, even revolutionary innovation (wealth and security frame) on the one hand, and as a mundane form of development (low impact development frame) and familiar and long-established process (manageable risk frame) on the other. This chimes with the work of Stokes (2016), who identifies how the governance and regulation of shale development in the UK are underpinned by two distinct framings. These distinct framings give rise to two regulatory strategies that work in tandem and are selectively applied to

different aspects of the issue (Stokes, 2016). The strategy of domain sees hydraulic fracturing as mundane and only incrementally different to related activities (Stokes, 2016). The domain strategy is applied to issues like risk (with the exception of seismicity), public health and the environment to justify the adequacy of existing regulations and deny the need for specific and burdensome extra regulation (Stokes, 2016). Dexterity, on the other hand, is a strategy applied to planning, finance and land access. Here incentives are created and barriers are removed to 'unlock' the benefits of this extraordinary, novel and revolutionary innovation (Stokes, 2016).

There is a similar inconsistency in calls to fast-track and streamline shale development and to avoid falling behind in the global race on the one hand, and reassurances over the strictness of regulation. Of course, discourse coalitions should not be treated as hive minds. They are loose coalitions of diverse actors who do not necessarily have shared perceptions of their interests and who may not even share and common understanding of the storylines that bind them. One possible explanation for this polyvalence is therefore that each side of these apparent inconsistencies is pursued by different factions within the pro-shale development coalition.

An alternative explanation brings us back to the work of Hajer. For Hajer, the political power of a storyline does not come primarily from its consistency, "but comes from its multi-interpretability"(Hajer, 1995, p. 61). In other words, various actors from various discursive traditions can read subtly different things into a slogan which expands its appeal and so its power. We can add to this that the broader framing strategies of coalitions may frame an issue inconsistently in an attempt to appeal simultaneously to very different audiences (e.g. investors on one hand, and concerned local communities on the other). Quite how effective this strategy is likely to be is open for debate given the clear scope for audiences to adopt messages that were not designed for them as part of their counter framing strategy (e.g. the anti-shale development coalition adopting talk of fast-tracking and streamlining). In short, we find evidence of the polyvalence of framing strategies – whether unwitting or intentional – as well as the pitfalls of this approach.

In sum, our study offers three lessons to the literature on frames, storylines and political communication more broadly. First, we offer an integrative approach to frames and storylines that covers both the coarse-grain level of selection and salience on the one hand, and the fine-grain level of intricate linguistic devices on the other. Second, we put forward the explanation of the impotence of frames and storylines in anticipatory political debate over a yet-to-be-deployed innovation as a result of a rich repertoire of contradictory and easily undermined analogies fuelling debate without achieving discursive dominance. Third and finally, we offer the notion of polyvalent framing strategies and the way that this polyvalence offers opportunities for the counter-framing strategies of non-target audiences.

6. Conclusions

Our study demonstrates that pro- and anti-shale development frames and their associated storylines have been widely used in the UK policy debate in the period 2010-2018. There is a perhaps surprising degree of contestation over shale gas, all the more so given that the UK has such a long

history with natural gas and a history of extractive industries going back centuries. Is there something new and sinister with shale gas, or is this contestation associated with an emblematic shift in context? With this in mind, we offer five synthetic conclusions.

Firstly, we find that the two most used frames by far on our analysis were the 'wealth and security' and 'manageable risk' frames. This suggests that these frames resonated strongly with the UK Government and many policy actors, as well as that they were strategically regarded as likely to resonate strongly with and persuade a broader public audience. These frames relate strongly to core imperatives like growth, security and control, and chime with a 'promethean' governing elite mindset (Dryzek et al., 2009). The question of the resonance of these frames with the broader public has been left open by this study, and whilst Bomberg (2015) assesses resonance interpretively, future work should assess the resonance of the relatively common set of frames discussed here with the broader public in a more robust fashion.

Second, the lack of a counter frame to the bad gas governance frame raises questions about the style of the Government's response to controversy over shale development. As Bomberg (2015) points out, the Government somewhat ironically appears to have a better idea of how to counter the epistemic claims associated with the elusive threat and dirty fossil fuel frames, than the more inherently political, justice-based claims associated with the bad gas governance frame. This suggests a technocratic mode of governance unable to respond to or even recognise these kinds of claims (Williams et al., 2017), and may be linked to Evensen's criticism of a lack of serious moral thought in shale development policy-making (Evensen, 2015).

Thirdly, further questions about governance are raised by the general lack of consensus over the framing of shale development within formal political sites, let alone amongst the broader public. Issues of legitimacy arise when the Government can pursue a pro-shale development policy without anything approaching discursive dominance on the matter. This point dovetails nicely with Bradshaw and Waite's concerns about the shale industry in the UK possessing legal license to operate without social or local political license to operate (Bradshaw and Waite, 2017). Our analysis adds that the industry's national political license is rather thin, is closely tied to the fate of the governing Conservative party, and is not underpinned by a shared framing at the national political level.

Fourth, our analysis of the use of political frames over time finds a messy palimpsest and a relatively deadlocked debate that if anything has shifted towards greater contestation (e.g. increase in party political opposition). This continued contestation means that the role of storylines in the 'communicative miracle' in Hajer's thinking is largely absent in our analysis. For Hajer, storylines have an important role to play in enabling communication across difference and in potentially creating consensus. In his acid rain case, a broad-based coalition is built around storylines like 'pollution prevention pays' in a way that is said to be emblematic ecological modernisation. In the UK shale gas case we currently find no such way forward, and the use of language is arguably better characterised as antagonistic, entrenched and strategic. We've speculated that this may be because of the apparent impotence of analogy and distinction storylines, especially in an issue that remains largely anticipatory.

Fifth and finally, and connected to the previous point, there is also the question of whether shale gas might be emblematic of a new environmental politics, in the way that acid rain was three or four decades ago. Whilst the bridge frame in particular is clearly an attempt to create a metaphor that

gets environmentalists to think differently about gas and therefore create a new coalition behind shale gas, it has arguably failed. In our analysis, this frame has very little resonance beyond the Conservative party. Of course, ecological modernisation has always had its critics from radical green circles; however, our corpus covers the institutions and practices of the UK political mainstream. This inability to mobilise consensus around a typical ecological modernist storyline like 'the bridge' may suggest a loss of credibility of the 'win-win' thinking of ecological modernisation in the context of the increasing urgency of the so-called 'climate emergency'. This 'win-win' thinking now seems to be increasingly challenged by more austere storylines that imply restraint and an end to business-as-usual (e.g. 'keep it in the ground'). The difficulty that the lower carbon fuel frame has had in resonating with a broad-based coalition of actors points to the difficulty of framing the development of new fossil fuel resources as acceptable and responsible in ways that start to question the power of ecological modernist thinking.

7. References

1. Andersson-Hudson, J., Knight, W., Humphrey, M., O'Hara, S., 2016. Exploring support for shale gas extraction in the United Kingdom. Energy Policy 98, 582–589. https://doi.org/10.1016/j.enpol.2016.09.042
2. Andrews, I.J., 2013. The Carboniferous Bowland Shale gas study: geology and resource estimation. London.
3. Beebeejaun, Y., 2017. Exploring the intersections between local knowledge and environmental regulation: A study of shale gas extraction in Texas and Lancashire. Environ. Plan. C Gov. Policy 35, 417–433. https://doi.org/10.1177/0263774X16664905
4. BEIS, 2018a. Energy Policy: Written statement. London.
5. BEIS, 2018b. BEIS Public Attitudes Tracker: September 2018 (Wave 27). London.
6. Benford, R.D., Snow, D.A., 2000. Framing Processes and Social Movement: An Overview and Assessment. Annu. Rev. Sociol. 26, 611–639. https://doi.org/10.1146/annurev.soc.26.1.611
7. Bomberg, E., 2017. Fracking and framing in transatlantic perspective: A comparison of shale politics in the US and European Union. J. Transatl. Stud. 15, 101–120. https://doi.org/10.1080/14794012.2016.1268789
8. Bomberg, E., 2015. Shale We Drill? Discourse Dynamics in UK Fracking Debates. J. Environ. Policy Plan. 1–17. https://doi.org/DOI: 10.1080/1523908X.2015.1053111
9. Bradshaw, M., Waite, C., 2017. Learning from Lancashire: Exploring the contours of the shale gas conflict in England. Glob. Environ. Chang. 47, 28–36. https://doi.org/10.1016/j.gloenvcha.2017.08.005
10. Cairns, R., Stirling, A., 2014. "Maintaining planetary systems" or "concentrating global power?" High stakes in contending framings of climate geoengineering. Glob. Environ. Chang. 28, 25–38. https://doi.org/10.1016/j.gloenvcha.2014.04.005
11. Chávez-Rodríguez, M., Varela, D., Rodrigues, F., Salvagno, J.B., Köberle, A.C., Vasquez-Arroyo, E., Raineri, R., Rabinovich, G., 2017. The role of LNG and unconventional gas in the future natural gas markets of Argentina and Chile. J. Nat. Gas Sci. Eng. 45, 584–598. https://doi.org/10.1016/j.jngse.2017.06.014
12. Committee on Climate Change, 2016. Onshore Petroleum: The compatibility of UK onshore petroleum with meeting the UK's carbon budgets.
13. Cotton, M., 2017. Fair fracking? Ethics and environmental justice in United Kingdom shale gas policy and planning. Local Environ. 22, 185–202. https://doi.org/http://dx.doi.org/10.1080/13549839.2016.1186613

14. Cotton, M., Rattle, I., Van Alstine, J., 2014. Shale gas policy in the United Kingdom: An argumentative discourse analysis. Energy Policy 73, 427–438. https://doi.org/http://dx.doi.org/10.1016/j.enpol.2014.05.031
15. Czolowski, E.D., Santoro, R.L., Srebotnjak, T., Shonkoff, S.B.C., 2016. Toward Consistent Methodology to Quantify Populations in Proximity to Oil and Gas Development: A National Spatial Analysis and Review. Environ. Health Perspect. 125, 1–11.
16. DECC, 2012. Gas Generation Strategy. London.
17. Dryzek, J.S., Goodin, R.E., Tucker, A., Reber, B., 2009. Promethean Elites Encounter Precautionary Publics: The Case of GM Foods. Sci. Technol. Hum. Values 34, 263–288. https://doi.org/10.1177/0162243907310297
18. Entman, R., 1993. Framing : Toward Clarification of A Fractured Paradigm. J. Commun. 43, 51–58.
19. Evensen, D., 2018. Review of shale gas social science in the United Kingdom, 2013–2018. Extr. Ind. Soc. 0–1. https://doi.org/10.1016/j.exis.2018.09.005
20. Evensen, D.T., 2015. Policy Decisions on Shale Gas Development (’Fracking'): The Insufficiency of Science and Necessity of Moral Thought. Environ. Values 24, 511–534. https://doi.org/10.3197/096327115X14345368709989
21. EY, 2014. Getting ready for UK shale gas.
22. Feldman, L., Hart, P.S., 2018. Climate change as a polarizing cue: Framing effects on public support for low-carbon energy policies. Glob. Environ. Chang. 51, 54–66. https://doi.org/10.1016/j.gloenvcha.2018.05.004
23. Glynos, J., Howarth, D., 2007. Logics of Critical Explanation in Social and Political Theory, 1st ed. Routledge, London; New York.
24. Goldthau, A., Sovacool, B.K., 2016. Energy Technology, Politics, and Interpretative Frames: Shale Gas Fracking in Eastern Europe. Glob. Environ. Polit. 16, 50–69. https://doi.org/10.1162/GLEP
25. Hajer, M., 1995. The Politics of Environmental Discourse: Ecological Modernization and the Policy Process. Clarendon Press, Oxford.
26. Hajer, M., Versteeg, W., 2005. A decade of discourse analysis of environmental politics: Achievements, challenges, perspectives. J. Environ. Policy Plan. 7, 175–184. https://doi.org/http://dx.doi.org/10.1080/15239080500339646
27. Hawkins, J., 2015. Fracking: Minding the gaps. Environ. Law Rev. 17, 8–21. https://doi.org/10.1177/1461452914563217
28. Hess, D.J., 2019. Coalitions, framing, and the politics of energy transitions: Local democracy and community choice in California. Energy Res. Soc. Sci. 50, 38–50. https://doi.org/10.1016/j.erss.2018.11.013
29. Hilson, C., 2015. Framing Fracking: Which Frames Are Heard in English Planning and Environmental Policy and Practice? J. Environ. Law 27, 177–202.
30. HoC ECCC, 2011. House of Commons Energy and Climate Change Committee: Shale Gas, Fifth Report of Session 2010–12, Volume I. London.
31. HoC Library, 2017. Shale gas and fracking: Briefing Paper. London.
32. IoD, 2013. Getting shale gas working.
33. Jaspal, R., Nerlich, B., 2014. Fracking in the UK press: threat dynamics in an unfolding debate. Public Underst. Sci. 23, 348–63. https://doi.org/10.1177/0963662513498835
34. Jaspal, R., Turner, A., Nerlich, B., 2014. Fracking on YouTube: Exploring Risks, Benefits and Human Values. Environ. Values 23, 501–527. https://doi.org/10.3197/096327114X13947900181473
35. Mackay, D., Stone, T., 2013. Potential greenhouse gas emission associated with shale gas extraction and use.
36. Mares, D., 2013. The Geopolitics of Natural Gas: Political Economy of Shale Gas in Argentina. Houston, TX. https://doi.org/10.1111/1468-0076.00100

37. Mason, J., 2002. Qualitative Researching, 2nd ed. Sage, London; Thousand Oaks; New Delhi. https://doi.org/10.1159/000105503
38. Mazur, A., 2016. How did the fracking controversy emerge in the period 2010-2012? Public Underst. Sci. 25, 207–222. https://doi.org/10.1177/0963662514545311
39. McGlade, C., Pye, S., Watson, J., Bradshaw, M., Ekins, P., 2016. The future role of natural gas in the UK.
40. Metze, T., 2017. Fracking the Debate: Frame Shifts and Boundary Work in Dutch Decision Making on Shale Gas. J. Environ. Policy Plan. 19, 35–52. https://doi.org/10.1080/1523908X.2014.941462
41. National Grid, 2017. Future Energy Scenarios (July 2017).
42. Nelsen, A., 2015. Polish shale industry collapsing as number of licenses nearly halves. Guard.
43. Nyberg, D., Wright, C., Kirk, J., 2018a. Fracking the Future: The Temporal Portability of Frames in Political Contests. Organ. Stud. 1–22. https://doi.org/10.1177/0170840618814568
44. Nyberg, D., Wright, C., Kirk, J., 2018b. Dash for Gas: Climate Change , Hegemony and the Scalar Politics of Fracking in the UK. Br. Acad. Manag. 29, 235–251. https://doi.org/10.1111/1467-8551.12291
45. Nyberg, D., Wright, C., Kirk, J., 2017. Re-Producing a Neoliberal Political Regime: Competing Justifications and Dominance in Disputing Fracking, in: Cloutier, C., Gond, J.-P., Leca, B. (Eds.), Justification, Evaluation and Critique in the Study of Organizations (Research in the Sociology of Organizations, Volume 52). Emerald Publishing Limited, Bingley, West Yorkshire, pp. 143–171.
46. Partridge, T., Thomas, M., Harthorn, B.H., Pidgeon, N., Hasell, A., Stevenson, L., Enders, C., 2017. Seeing futures now: Emergent US and UK views on shale development, climate change and energy systems. Glob. Environ. Chang. 42, 1–12. https://doi.org/10.1016/j.gloenvcha.2016.11.002
47. Partridge, T., Thomas, M., Pidgeon, N., Harthorn, B.H., 2018. Urgency in energy justice: Contestation and time in prospective shale extraction in the United States and United Kingdom. Energy Res. Soc. Sci. 42, 138–146. https://doi.org/10.1016/j.erss.2018.03.018
48. Public Health England, 2014. Review of the Potential Public Health Impacts of Exposures to Chemical and Radioactive Pollutants as a Result of the Shale Gas Extraction Process.
49. Rattle, I., Baker, T., Van Alstine, J., 2018. Shale gas development in England: a tale of two mineral planning authorities, in: Whitton, J., Cotton, M., Charnley-Parry, I., Brasier, K. (Eds.), Governing Shale Gas: Development, Citizen Participation and Decision Making in the US, Canada, Australia and Europe. Routledge, Abingdon; New York, pp. 227–241.
50. Rosa, L., D'Odorico, P., 2019. The water-energy-food nexus of unconventional oil and gas extraction in the Vaca Muerta Play, Argentina. J. Clean. Prod. 207, 743–750. https://doi.org/10.1016/j.jclepro.2018.10.039
51. Sarewitz, D., 2004. How science makes environmental controversies worse. Environ. Sci. Policy 7, 385–403. https://doi.org/10.1016/j.envsci.2004.06.001
52. Sarewitz, D., 2000. Science and environmental policy: a excess of objectivity, in: Frodeman, R. (Ed.), Earth Matters: The Earth Sciences, Philosophy, and the Claims of Community. Prentice Hall, Upper Saddle River, NJ, pp. 79–98.
53. Schon, D., Rein, M., 1994. Frame Reflection: Toward the Resolution of Intractable Policy Controversies. Basic Books, New York.
54. Short, D., Szolucha, A., 2016. Fracking Lancashire: The planning process, social harm and collective trauma. Geoforum 1–13. https://doi.org/10.1016/j.geoforum.2017.03.001
55. Stedman, R.C., Evensen, D., O'Hara, S., Humphrey, M., 2016. Comparing the relationship between knowledge and support for hydraulic fracturing between residents of the United States and the United Kingdom. Energy Res. Soc. Sci. 20, 142–148. https://doi.org/10.1016/j.erss.2016.06.017
56. Steger, T., Milicevic, M., 2014. One Global Movement, Many Local Voices: Discourse(s) of the

Global Anti-Fracking Movement. Adv. Sustain. Environ. Justice 15, 1–35. https://doi.org/http://dx.doi.org/10.1108/S2051-503020140000015002
57. Stephan, H.R., 2017. The discursive politics of unconventional gas in Scotland: Drifting towards precaution? Energy Res. Soc. Sci. 23, 159–168. https://doi.org/http://dx.doi.org/10.1016/j.erss.2016.09.006
58. Stokes, E., 2016. Regulatory Domain and Regulatory Dexterity : Critiquing the UK Governance of " Fracking ." Mod. Law Rev. 79, 961–986.
59. Suddaby, R., 2006. From The Editors: What Grounded Theory is Not. Acad. Manag. J. 49, 633–642.
60. Szolucha, A., 2018. Community understanding of risk from fracking in the UK and Poland: how democracy-based and justice-based concerns amplify risk perceptions, in: Whitton, J., Cotton, M., Charnley-Parry, I., Brasier, K. (Eds.), Governing Shale Gas: Development, Citizen Participation and Decision Making in the US, Canada, Australia and Europe. Routledge, Abingdon; New York, pp. 242–255.
61. The Royal Society & Royal Academy of Engineering, 2012. Shale gas extraction in the UK: a review of hydraulic fracturing. London.
62. Thomas, M., Partridge, T., Harthorn, B.H., Pidgeon, N., 2017. Deliberating the perceived risks, benefits, and societal implications of shale gas and oil extraction by hydraulic fracturing in the US and UK. Nat. Energy 2, 1–7. https://doi.org/10.1038/nenergy.2017.54
63. Torfing, J., 2011. Policy, discourse models, in: Badie, B. (Ed.), International Encyclopedia of Political Science. Sage, London, pp. 1881–1884.
64. UKOOG, n.d. What it looks like [WWW Document]. URL http://www.ukoog.org.uk/community/what-it-looks-like (accessed 1.4.19).
65. Urquhart, C., 2013. Grounded theory for qualitative research: a practical guide. Sage, London; Thousand Oaks; New Delhi.
66. Waterworth, A., Bradshaw, M.J., 2018. Unconventional trade-offs? National oil companies, foreign investment and oil and gas development in Argentina and Brazil. Energy Policy 122, 7–16. https://doi.org/10.1016/j.enpol.2018.07.011
67. Whitmarsh, L., Nash, N., Upham, P., Lloyd, A., Verdon, J.P., Kendall, J.-M., 2015. UK public perceptions of shale gas hydraulic fracturing: The role of audience, message and contextual factors on risk perceptions and policy support. Appl. Energy 160, 419–430. https://doi.org/10.1016/j.apenergy.2015.09.004
68. Williams, L., Macnaghten, P., Davies, R., Curtis, S., 2017. Framing "fracking": Exploring public perceptions of hydraulic fracturing in the United Kingdom. Public Underst. Sci. 26, 89–104. https://doi.org/10.1177/0963662515595159
69. Wolske, K.S., Todd, A., Rossol, M., McCall, J., Sigrin, B., 2018. Accelerating demand for residential solar photovoltaics: Can simple framing strategies increase consumer interest? Glob. Environ. Chang. 53, 68–77. https://doi.org/10.1016/j.gloenvcha.2018.08.005
70. Wood, J., 2012. The Global Anti-Fracking Movement: What it wants, how it operates and what' s next. London.